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Clayton GROUP SERVICES

TECHNICAL MEMORANDUM

To: Steve Faryan

From: Ron St. John

CC: Stan Komperda

Subject: **Confirmation Sampling Plan for Areas 1, 2 and Former Degreaser Area at the Lockformer Site Related to the Removal Action Unilateral 106 Order.**

Date: October 16, 2003

INTRODUCTION

The United States Environmental Protection Agency (USEPA) approved the Lockformer Work Plan (LWP) dated September 20, 2002. The LWP identifies the placement of borings to sample soils (confirmation samples) between electrodes in order to determine if the electrical resistive heating (ERH) remedial technology has reduced concentrations of volatile organic compounds (VOCs) in the upper fill/till to levels below the Removal Action Objectives (RAOs) identified in Table 3.0-1 of the LWP. However, the LWP does not identify the number and vertical location of soil samples to be collected in each boring during this confirmation sampling process, and how sub-areas can be sequentially shut down to make the ERH remediation more efficient. During meetings between Lockformer and the USEPA in December, 2002 and January, 2003 the general acceptability of various confirmation sampling alternatives for the ERH remediation were discussed. The discussions during those meetings resulted in a general conclusion that confirmation sampling and field screening utilizing a membrane interface probe (MIP) was not technically advantageous. Instead, it was suggested that the confirmation sampling be performed more similarly to the delineation sampling that was performed at the site previously. This resulted in re-issuance of this Confirmation Sampling Plan Technical Memorandum on April 17, 2003. The IEPA issued comments to the April 17, 2003 technical memo in a letter dated May 8, 2003. Direct discussion of these comments was undertaken in a meeting at Lockformer following the issuance of the May 8, 2003 comments. This revised technical memo attempts to address both of these written and verbal comments.

PURPOSE

It is the purpose of this technical memorandum to detail the scope of work not previously defined in the LWP that will be undertaken during confirmation sampling of the upper till/fill at the Lockformer site.

SCOPE OF WORK

Figure 1 illustrates the location of confirmation sampling borings described by Section 5 of the LWP for the ERH system. Confirmation sampling implementation will be determined by two criteria. These criteria are outlined as follows:

- After the soils have been brought to temperature (average greater than 87°C), an evaluation of the operational time necessary to treat the soils to below the RAOs will be performed by Thermal Remediation Systems (TRS) based on the starting concentrations in the soils, the length of time to bring the soils up to temperature, and the amount of electrical energy input into the soils.

- Analytical measurements of the air from each sub-area of the ERH system indicate that the chemical constituent loading has reached an asymptotic decline.

Operational Evaluation

The analytical measurement of air from each sub-area of the ERH system will be performed by collecting an air sample from a sampling port installed on the header piping from each sub-area. The raw air stream from the sub-area contains steam vapor that must be removed prior to sample analysis. Therefore, the raw air sample will be pulled through tubing that is chilled by an ice bath in order to condense the steam vapor and allow for collection of the remaining air into a Tedlar bag. The air sample in the Tedlar bag will then be analyzed using ~~the onsite total hydrocarbon analyzer~~. a photoionization detector (PID). A select number of samples exhibiting elevated concentrations will be submitted for laboratory analyses to determine chemical speciation.

The specific chemical constituency of these air samples is assumed to be the same as that identified through Summa canister sampling and TO-15 analysis conducted during ERH startup. As indicated in Section 4.4 of the approved LWP, samples of system effluent will be analyzed using both the onsite hydrocarbon analyzer and Summa canister analysis to develop a correlation. The ERH system will be more specifically monitored by way of vapor samples collected from each electrode and sub-area. The vapor concentrations coming from any sub-area will be determined to be asymptotic when two successive samples are within 80% of the concentration determined to be present in the sample taken prior to them (with the general understanding that the USEPA, the IEPA and their consultants will confer with Lockformer representatives and TRS to determine the

reasonable point at which this occurs). Sampling frequency for each sub-area will be at least weekly once the soil has reached the design temperature.

When asymptotic conditions as described above have been met, the theoretical electrical energy input required for treatment will be compared with the actual energy input into each sub-area. The results of these theoretical electrical energy calculations and actual energy input will be shared with the USEPA and the IEPA. At the point of adequate electrical energy input and an asymptotic decline in vapor concentrations, confirmation sampling will be recommended.

Confirmation Sampling Locations and Depths

After a determination is made that confirmation sampling is appropriate, confirmation sampling will commence at the locations identified on Figure 1. The number of samples submitted for laboratory analysis from each boring location will be based on a combination of existing information as to the current depth of the highest TCE concentration (previous delineation investigation) and field screening data that will be collected during the confirmation sampling activities.

An evaluation of the depth intervals previously identified as exhibiting the most elevated concentrations of TCE from the delineation sampling was performed. These intervals were converted to mean sea level elevations (using the center point of each sample interval) and plotted along with their corresponding TCE concentrations. This data is presented on Figure 2.

Areas 1 and 2 were further divided into sub-areas based on the elevation of the highest TCE soil concentration occurrence previously determined from the delineation borings within that sub-area. In seven of the sub-areas the highest delineation soil sample TCE concentration was observed over a two-foot interval within that sub-area. Of the remaining sub-areas, two had the highest TCE concentrations over an eight-foot interval; four had the highest TCE concentrations observed over a four-foot interval (including the degreaser); and, one had the highest TCE concentrations observed over a three-foot interval. The soil boring locations from Figure 1 and the sub-area designations and depths from Figure 2 were combined together to create Figure 3.

Sampling Methodology

Generally, the confirmation sampling will take place in a similar manner to the delineation sampling. However, special consideration will be given to the field screening

procedures and sample preparation for laboratory analyses; the sampling of intervals that previously exhibited the most elevated concentrations in each sub-area; and the sampling of the fill/till interface with the mass waste unit.

Sampling will occur at each of the confirmation sampling locations depicted on Figure 3 for each sub-area. The sampling will be performed by Geoprobe utilizing a four foot tube sampler fitted with stainless steel sampling sleeves on the interior. Each stainless steel sampling sleeve will be approximately six-inches in length. Upon retrieval of each four-foot Geoprobe sampling tube, the six-inch sleeves will immediately be capped utilizing poly caps with electrical tape to secure them, and will be labeled with the appropriate boring number and sample depth. In instances where the sleeves are not completely filled by the acquired soil sample, the remainder of the sleeve will be filled with modeling clay and then capped. The six-inch stainless steel sampling sleeves that comprise each one-foot sampling interval will then be segregated. One six-inch interval will be immediately placed in a cooler for archiving and chilled to 4° C $\pm$ 2° C for potential laboratory analysis later. The other six-inch interval will be allowed to cool to ambient temperatures for use in headspace screening.

Once all the stainless steel sampling sleeves from a given boring have cooled to ambient temperatures the samples will be extracted from the stainless steel sampling sleeves into plastic zip-lock bags. The samples will be allowed to sit in the zip-lock bags for approximately ½-hour to allow equilibration of the headspace. A headspace sample will then be acquired for each one-foot interval based on the six-inch sample. The headspace sampling results will be used to submit samples for laboratory analysis utilizing the following criteria:

1. The sample exhibiting the most elevated headspace value for each ten-foot interval will identify the archived six-inch sample to be submitted for laboratory analysis.

2. If the sample identified by this headspace analysis is not within the sub-area interval which was previously identified as exhibiting the most elevated soil concentrations, then an additional sample will be submitted for laboratory analysis based on the most elevated headspace reading acquired within that interval.

3. On a random basis, 10% of the soil boring locations will be sampled at the fill/till and mass waste unit interface to provide assurance to the Agencies that contamination has not migrated downward to cause and undetermined problem throughout the ERH remediation process.

Once the specific samples for laboratory analysis are identified for each boring, those specific archived samples will be removed from the stainless steel sleeves and prepared

for laboratory analysis according to the procedures outlined in the draft Method 5035A, Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples, July, 2002. In a similar fashion to the delineation sampling, 10% of the samples will have duplicate analyses performed, and a matrix spike/matrix spike duplicate will be performed by the lab every 20 samples.

Remediation Goal Determination

Upon acquiring the laboratory analyses for the soil samples from each sub-area, the chemical analyses will undergo the statistical analysis procedure identified in the approved LWP to determine if the RAOs have been achieved for that sub-area. If it is determined that the RAOs have not been achieved in that sub-area, the ERH system operation will continue to treat the subsurface soils. If it is determined that the RAOs have been achieved, the electricity to that sub-area will be turned off with vacuum extraction from the sub-area maintained. When it is time to perform confirmation sampling in an adjacent sub-area still undergoing treatment, two to four locations along the previously closed sub-area boundary will be sampled again to verify that vapor migration has not occurred into the closed area to cause an exceedence of the RAOs during the intervening period. This data will be shared with the USEPA and the IEPA to provide for their evaluation and concurrence that this additional sub-area perimeter sampling is adequate.

There are multiple scenarios where it may be determined that a sub-area fails to meet the RAOs. In general, when this occurs the distribution of the soil samples that fail to meet the RAO criteria will be evaluated, and the appropriate continued operation of the ERH system for that sub-area will be recommended. Depending on the distribution of the samples not meeting the RAO criteria, this further recommendation to operate the ERH system in that sub-area may include continued heating of the entire sub-area or a portion of the sub-area. In either event, after the selected area is further heated to the point where it is again deemed ready to be sampled, confirmatory soil samples will be acquired adjacent to the previous samples that resulted in the RAO being exceeded. Lockformer will seek input from the USEPA and the IEPA on the adequacy of this additional confirmatory sampling prior to performing it.

The approved LWP had indicated that the confirmation sampling for the degreaser area would be consistent with remediation through excavation. Recently, a decision was made to complete the remediation of the degreaser with ERH in a similar manner to Areas 1 and 2. Since the degreaser will no longer undergo remediation through excavation, the confirmatory sampling and laboratory data evaluation will be conducted in the former vapor degreaser area in a similar manner as that indicated for Areas 1 and 2 above.

TECHNICAL MEMORANDUM

(Continued)

Attachments: Figure 1 – Confirmation Boring Locations for Upper Fill/Till
Figure 2 – Investigation Sampling Depth Intervals with Highest TCE Concentrations
Figure 3 – Confirmation Sampling Depth Intervals

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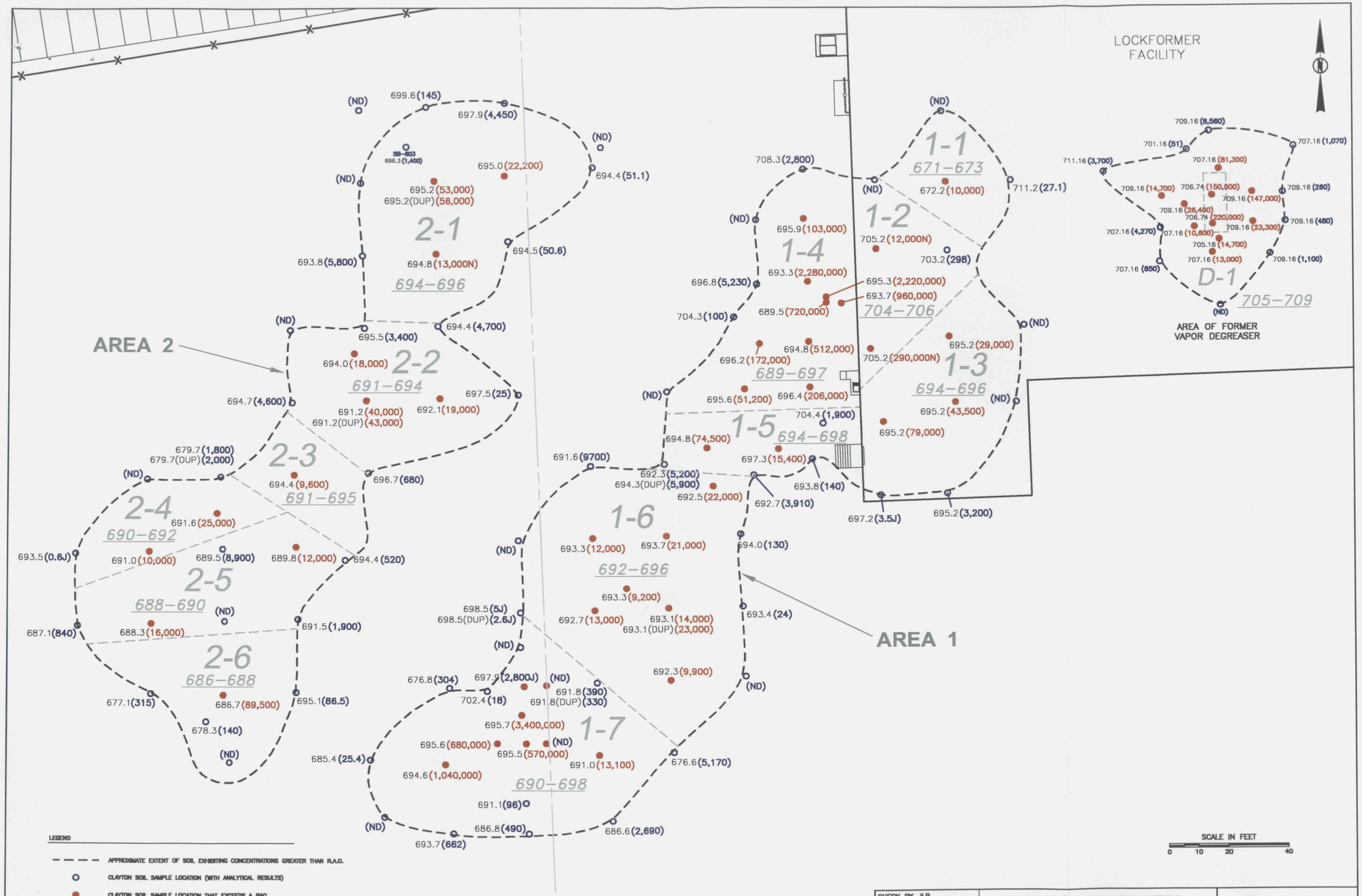
FIGURE 1 – CONFIRMATION BORING LOCATIONS FOR UPPER FILL/TILL

☐ **Other:**



LEGEND

- APPROXIMATE EXTENT OF SOIL EXHIBITING CONCENTRATIONS GREATER THAN R.A.O.
- CLAYTON SOIL SAMPLE LOCATION (WITH ANALYTICAL RESULTS)
- CLAYTON SOIL SAMPLE LOCATION THAT EXCEEDS A RAO
- ND — NON-DETECT
- 695.1(12.2) — SAMPLE DEPTH (MSL) – TCE CONCENTRATIONS (CONCENTRATIONS SHOWN IN RED INDICATE A RESULT THAT EXCEEDS A RAO)

NOTE:

1. ALL RESULTS SHOWN IN ug/kg OR PARTS PER BILLION.
2. SUB AREA ELEVATION INTERVALS ARE SHOWN IN MEAN SEA LEVEL (MSL).

SCALE IN FEET
0 10 20 40

CHECK BY	JLP
DRAWN BY	BCP
DATE	12-20-02
SCALE	AS SHOWN
CAD NO.	6526316K
PRJ NO.	65263.01

INVESTIGATION SAMPLING DEPTH INTERVALS WITH HIGHEST TCE CONCENTRATIONS

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FIGURE 2

LOCKFORMER FACILITY

AREA OF FORMER VAPOR DEGREASER

AREA 1

AREA 2

1-1 671–673

1-2

1-3 694–696

1-4 689–697

1-5 694–698

1-6 692–696

1-7 690–698

2-1 694–696

2-2 691–694

2-3 691–695

2-4 690–692

2-5 688–690

2-6 686–688

D-1 705–709 704–706

LEGEND

- - - - APPROXIMATE EXTENT OF SOIL EXHIBITING CONCENTRATIONS GREATER THAN R.A.O.

PROPOSED CONFIRMATORY SOIL BORING

NOTES:

1. FINAL LOCATIONS MAY BE MODIFIED SLIGHTLY BASED ON SITE FEATURES AND ERH ELECTRODE LOCATION.
2. SUB AREA ELEVATION INTERVALS ARE SHOWN IN MEAN SEA LEVEL (MSL).

SCALE IN FEET

0 10 20 40

CHECK BY	
DRAWN BY	BCP
DATE	12–20–02
SCALE	AS SHOWN
CAD NO.	6526316L
PRJ NO.	65263.01

CONFIMATION SAMPLING DEPTH INTERVALS

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FIGURE 3